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Editor: D. B. Finn

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Figure 1. An outrigger canoe fitted with an outboard motor as introduced by FAO/ETAP expert, Alan Glanville, in Ceylon, where many local-type fishing boats have been mechanized.

FELLOWSHIPS IN FISHERIES IN THE FAO PROGRAM [1]

Introduction

The General Assembly of the United Nations at its fourth session, held in 1949, approved a resolution of the Economic and Social Council (ECOSOC) which initiated an Expanded Technical Assistance Program (ETAP) to underdeveloped countries. This program is financed by contributions from member countries of the United Nations and of the Specialized Agencies — for example, FAO. Each agency has been allocated a fixed percentage of the total contributions to the Special Fund for Technical Assistance. FAO's share is at present 28 percent. The executive heads of the United Nations and the Specialized Agencies or their representatives form the Technical Assistance Board (TAB), a body created for the broad co-ordination of the administrative and financial aspects of the program.

The fields of assistance are virtually as broad as are the human activities involved in the economic and social development of any country, each organization concentrating on its specialized subjects. Within the framework of FAO we find agriculture, including irrigation, soil management, farm machinery, crop production, insect control, animal breeding and diseases, and agricultural research institutes ; forestry and forest products ; nutrition ; rural institutions and services ; agricultural economics including statistics ; and, of special interest here, all aspects of fisheries.

Technical assistance is rendered to governments of underdeveloped countries only in response to requests, and technical assistance projects consist of three main elements : (1) advice and assistance through the employment of experts ; (2) training through training centers, fellowships and in-service training given by experts ; (3) equipment for the use of the expert as the " tools of his trade. "

I. FAO Fellowship Policy

Since the beginning of FAO's activities for the implementation of the Expanded Technical Assistance Program, in the latter part of 1950, the principle has been adopted that the award of fellowships should be complementary to projects of technical assistance requested by the governments. This policy is still maintained and only in a few cases are fellowships awarded as projects in themselves. FAO experts, in nearly all instances, work in the field for several months before the question of the award of fellowships is raised. Some general explanation of this policy is necessary.

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[1] By J. de Martini, Chief, ETAP Fellowships Section, FAO, Rome.

1. *The Expert's Work*

It is difficult to outline in a few sentences how the experts help the governments to create, develop and improve techniques in FAO's field of activities. To produce and consume more and better food is still the main purpose. In many countries fish can readily contribute to an increase in the protein content of the diet and, therefore, increased availability of fish is most important in a program of better nutrition.

The possibilities for promoting fisheries development are wide and it is easy to understand why experts have been requested in fisheries biology, inland and brackish water fisheries and fish culture ; fisheries technology, fishing craft design and mechanization, gear technology and fish handling ; and in fisheries economics, marketing and distribution. Many such experts are now working in the field in most of the countries asking for technical assistance.

These experts, however, stay for a relatively short time in the field, from a few months only to one or two years. FAO is anxious not only to introduce new ideas on development possibilities and to advise on changes or improvements in techniques and administration, but also to ensure the continuity of assistance given by the experts and a follow-through of the recommendations contained in their final reports. In agriculture, and even more in fisheries, it is hard to break old traditions, and patience and perseverance are necessary when introducing new techniques. At Headquarters we know that " Rome was not built in a day " and we realize that without the support of a well-trained staff of technicians in the country, from the independent fishermen through extension workers and fisheries administrators, through the chiefs of laboratories and specialists in fish marketing and fish processing up to the Director of Fisheries, the very best advice would not mean more than a piece of paper which might too easily disappear in the drawer of some office desk.

That the responsible staff in the country should be able to execute the expert's advice is as important as the advice itself, and technical assistance consists, for a large part, in training in all its aspects. Practical knowledge of how to apply the new techniques is often of more immediate importance than theoretical knowledge. The experts, therefore, are asked to train technicians during their assignment and the governments are requested to attach to the missions as counterparts those officials who are designated to carry on the expert's work. The value of this form of training cannot be overestimated.

2. *Training Centers*

There are, however, additional possibilities of preparing nationals for the follow-up on the expert's recommendations. Besides the in-service training of persons by the expert, as mentioned above, a very efficient medium is the training center or seminar, either national, regional or international, to which 20 to 50 specialists are invited to

tudy and to discuss specific problems. FAO Fisheries Division has, n recent years, organized several such training courses, i.e., the Semi- ıar on Brackish Water Fish Culture ,[2] in Indonesia, in 1952, with 8 students from eight countries ; the Indo-Pacific Fisheries Statistics Training Center ,[3] at Bangkok, Thailand, 1952, with 35 trainees from 6 countries ; the Latin American Fisheries Training Center ,[4] at Val- paraiso, Chile, in 1952, with 43 trainees from seven countries ; and he Training Center in Fishery Biology ,[5] at Istanbul, Turkey, in 1953, vith 21 participants from three countries.

These training centers have given such good results that this form of technical assistance is now a part of any well balanced program every year. In 1954, one further training center has been included n the program, namely the Fish Marketing Training Center for the Indo-Pacific region to be held in Hong Kong, July-August 1954 (*see* p. 129).

The question has been raised whether the training center is not a better and perhaps less expensive medium of technical assistance than the sending of experts to the field or even the award of fellowships, the third form of training. The answer is that all three forms are efficient if applied in the right way to the given circumstances, and if well balanced will give better results than would concentration on only one of them. The more interconnected these three forms of assistance are the better, and often all three applied together give the best result.

3. *Fellowships*

If no training facilities exist in a given field in the countries receiving technical assistance, and if the training in seminars or centers is sufficient to prepare nationals for their duties in development programs, then the award of grants for training abroad comes in, i. e., the award of fellowships.

II. The Administration of FAO Fellowships

1. *Number of Fellowships*

In comparison with the very high number of requests from governments for technical assistance experts and fellowships every year, the funds at the disposal of ETAP are relatively limited, and therefore the number of fellowships awarded will normally not exceed one or two per expert. Preference is thus given to government officials having responsibilities in their fields of activity and governments are asked to ensure that the Fellow is employed in public service on his return

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[2] *See FAO Fisheries Bulletin*, IV (3), 32 ; V (1), 26-27 ; V (2), 63-64 ; V (3/4) 157 ; V (5), 201-4.

[3] *See FAO Fisheries Bulletin*, IV (5), 40 ; V (3/4), 154-55.

[4] *See FAO Fisheries Bulletin*, IV (1/2), 42-43 ; IV (3), 40-41 ; IV (4), 29-31 ; V (2), 63, 82-85, VII (3), 130.

[5] *See FAO Fisheries Bulletin*, VII (1), 31-32.

to his country in a position where he will apply the knowledge he has gained during the fellowship. The ideal is to train technicians who have already had not only a suitable specific education in their particular subjects but also – and this is as important as educational background – some or even several years of practical experience. It should be emphasized that fellowships planned and budgeted for each year have a definite relation to the program of technical assistance experts' work in the field ; and further, that fellowships are only granted upon request of, and nomination by, governments.

2. *Selection and Nomination*

The variety of subjects in which training grants are offered is as wide as the fields for which experts are sent on assignments. The best preparation is for the candidate to work as a counterpart assistant to the FAO expert in the field ; he thus not only becomes acquainted with the specific problems involved in the subject for which the expert is giving suggestions for development plans, but has an opportunity of starting to prepare for the studies he will make abroad. This is the reason why it is the duty of FAO experts not only to assist governments in selecting the right man, but also to discuss with government officials and the candidate himself the type of training, the program of studies, practical work and observation tours, and to make proposals to Headquarters.

The candidates are nominated by the governments for the fellowships which have been planned, and the proposed study programs are then given careful consideration at FAO Headquarters by specialists in the technical division concerned and in the Fellowships Section of the Central Unit of ETAP. The Chief of ETAP takes the final decision to approve or reject the nomination.

3. *Training Programs*

Once the candidate has been selected according to the routine outlined above, the problem of establishing a suitable study program becomes easier. One knows his educational background and his experience ; one is aware of the responsibilities he will have to take up on return to his own country ; the FAO/ETAP expert, in consultation with government officials and the candidate himself, has made valuable suggestions. The period of training, which will normally not exceed one year, but is often shorter, is fixed in order that it may be used to the Fellow's best advantage. The officer preparing the final program has therefore at his disposal all the information he needs. Not only do subjects of training vary, but the types and forms of training also are quite different in each case.

Strictly speaking, it is, perhaps, inaccurate to call these training facilities " fellowships, " a word which to-day means – quoting from Webster's dictionary – " a foundation for maintenance of a graduate student called a ' fellow ,' who is pursuing some special line of study

and usually resides at the university." As, however, no expression exists to cover all types of trainee in whom FAO is interested, we use the word "fellowship" in a broader sense to include not only specialized studies at universities but also training in laboratories, research stations, on-the-job training, practical work in administration, study tours or several of such types of training combined.

From FAO's experience, covering three years' work, during which some 300 fellowships have been awarded in five main fields (agriculture, fisheries, forestry, nutrition and agricultural economics, including statistics), certain important conclusions may be drawn. Very often it is not theoretical knowledge which is lacking nor intellectual understanding of technical questions, but the knowledge of how to apply techniques of methods, and efficiency of work. Training programs, therefore, very often include practical work.

4. *Choice of Countries of Training*

The programs are prepared at Headquarters for proposal to the countries where the candidate is expected to undergo his training.

Many factors are taken into consideration when selecting these countries, namely :

(*a*) knowledge of the language – this is not only important from the Fellow's point of view but is also a question of courtesy to his tutors and supervisors ;

(*b*) the training facilities offered ;

(*c*) climatic conditions, and economic and demographic factors: for example, the problem of mechanization of techniques is quite different in a densely populated country from a region where manpower is not so readily available ;

(*d*) it has often proved very convenient to have a Fellow trained in the country from which the expert comes ;

(*e*) finance. As many contributions to ETAP for use in implementing technical assistance projects are made in currencies which are not readily convertible, Fellows may be placed in specific countries for financial reasons. However, great care is exercised in such cases to safeguard the most important aim of the program, which is excellence of training.

When the candidate has finally been selected, the purpose of training fixed and the program proposed, the Fellowships Section at FAO Headquarters then approaches the host countries for acceptance of the Fellow, giving not only information on the candidate and the suggested program of his training, but also on the technical assistance project itself, thus showing as clearly as possible the purpose of the Fellowship.

As soon as he has been accepted, the Fellow is instructed by the Fellowships Section to start his studies.

5. *Financial Obligations*

FAO finances the fellowships from ETAP funds not only by the payment of monthly stipends at rates fixed for each country by the Technical Assistance Board, but also shares 50 percent of the travel costs from the country of origin to the country of studies and back; FAO pays the tuition fees, book allowances and traveling in connection with the program within the countries of training. The obligations of the Fellow's government are restricted to ensuring that he receives whole or part of his salary during his absence, medical clearance, visa expenditure, and the other 50 percent of external travel costs.

6. *Training*

Each Fellow, if possible, receives two to three days' briefing on his way to the country of study, either at FAO Headquarters in Rome, or in one of FAO's regional offices, such as at Washington, Cairo, Bangkok or Rio de Janeiro. At Headquarters he gets in direct touch with the officers of the technical divisions, and in particular with the specialist who will take care of him like a "godfather" in reading his monthly report while he is training, in giving guidance as necessary and in discussing, by correspondence, the progress of his training. This system of close technical supervision is considered essential for the purpose for which FAO awards fellowships; only a technical expert in his own field can ensure that the Fellow gets the most out of the training offered, and can judge that he is fitting himself for his future work in his own country. This aspect of the FAO/ETAP fellowships is considered so valuable that certain countries have offered to finance their own fellowships if FAO will administer and "godfather." The Fellowships Section ensures co-ordination and collaboration in this connection and looks after all administrative matters during the Fellow's period of study.

On conclusion of his training, the Fellow is asked to submit a final report, in which he should not only give a summary of his training, the courses he has attended, the laboratory work performed and the places visited, but also express his own opinion on how the knowledge he has gained can be used on return to his own country.

The final report is studied by the "godfather" in the technical division; his comments are transmitted to the Fellow, who is expected to resume his post or take up duties in a position created for him.

III. FAO Fellowships in Fisheries

In order to illustrate the principles explained, this chapter contains a description of the fellowships awarded in relation to fisheries projects of technical assistance from 1951 to date.

The technical information is based on project descriptions prepared by the officers in the Fisheries Division (*see* pp. 110-111 giving list of fellowships awarded in fisheries from 1951 to 1953).

British Guiana. This fellowship is the only one awarded in fisheries as a project by itself, i. e., without an expert being sent into the field. Since the Government of British Guiana is already aware of the problems and possibilities of developing inland fisheries, and mainly fish culture in ponds, swamps and rice fields, and as the holder of the fellowship is already a specialist, FAO has accepted their request.

The study tour arranged in the Far East is intended to give the Fellow, a Fisheries Officer in the Department of Agriculture, an over-all picture of practices and achievements made in fish culture in ponds in that region. He will also spend short periods in Brazil and Israel, and Haiti where FAO experts are assisting in developing fish culture in ponds. He should then be able to decide which practices are suitable for development in British Guiana.

Chile. The FAO/ETAP Fishery Mission in Chile has been active in several fields. This country with its 2,600 miles of coastline, has a high potential fish production and, therefore, of natural resources of protein food necessary for better nutrition, but in its present state the exploitation of these resources is handicapped by inadequate techniques and equipment. At the same time, development is held up by considerable consumer resistance. A consumer education campaign carried out by the Government, assisted by an FAO/ETAP expert, has already been completed, and the results in stimulating a larger fish consumption are promising. Furthermore, two FAO experts have made a survey of marine fishery resources.

Several Chileans attended the Latin American Fisheries Training Center at Valparaiso. Out of the five fellowships foreseen for outstanding students of the Center, two have been awarded to Chilean nationals.

The study programs have been prepared in relation to the Government's development plans. Both fellowships, the first in Fisheries Administration and Legislation, including economic aspects of fisheries, and the second in Fish Processing Techniques, are therefore closely integrated with Chile's over-all program of fishery development.

Ecuador. In 1952, FAO/ETAP supplied an expert for six months to initiate an appraisal of the marine fishery resources along the main coast and in the Galapagos area, and to make recommendations for the increased exploitation of these resources. No suitable trained fisheries personnel are available locally to carry on the work started by the expert, and the fellowship awarded is in direct relation to the work of the expert. The selection of the candidate was, in this case, made by the Director of the Latin American Training Center held in Valparaiso. The Fellow is expected, after his training in France, to take an active part in the management of fisheries resources in Ecuador.

Finland. Six fellowships were awarded in 1953 after a survey of the marine and inland fisheries made by an FAO/ETAP fisheries administrator. In his final report the expert recommended a suitable policy for the development of the fisheries, reviewed the structure and activities of the Governments' fishery administration, statistical service

Figure 2. Work is started on a pond being built at Kahuripan (Central Java).

Figure 3. The soil is loosened and the lumps are used to build the embankments.

Figure 4. A bamboo guide and lines are used in the construction of the embankments. A worker can be seen using his foot to smooth up the dike, which is practically finished.

Figure 5. The pond is now finished.

(These four photographs of pond construction were taken by FAO/ETAP Fellow, Leonce Bonnefil, of Haiti, while in his country of study, Indonesia).

and the fisheries research department, and made suggestions for modification of the fisheries legislation. He also assisted in the selection of the six candidates for fellowships and suggested the subjects of training of this team as a direct result of his survey of Finnish fisheries.

Haiti. When in 1950 an FAO/ETAP expert started his duties in Haiti, the indigenous fresh-water fish fauna were poor and unproductive. He found, however, that the lakes, lagoons and swamps were rich in aquatic food and capable of producing large quantities of fish. As the standard of nutrition of the rural population is low, an increase in the production of protein foods is one of the urgent problems of the country.

The expert and his successor worked for three years ; they constructed hatcheries and introduced such fish as carp and *Tilapia* both for rough release in natural waters and for use in fish culture. Prolific spawning has been achieved on pond farms and large quantities of fry were distributed to various centers for further distribution to private fish culturists. As the development of fish culture will, however, need a well organized extension service, two fellowships have been awarded to Haitian fisheries officers who assisted the expert in his work ; the first to the Chief of the Section of Zoology of the Department of Agriculture, who is now taking care of all biological aspects of fish culture, and the second to the officer in charge of operations of stocking natural waters and constructing ponds in many places.

Israel. Fish farming in Israel was started in 1934 with the introduction of European carp, which successfully spawned in ponds. Rapid development took place, increasing the production from 1 metric ton in 1939 to 3,600 metric tons in 1951. As, however, the pond industry is still based on European carp, a fish which has to be fed with imported foodstuffs, two Israeli fisheries officers on FAO fellowships were given the opportunity of studying the culture of plant- and plankton-feeding fish in Far Eastern countries. These Fellows took back from their study tour three types of fish which are being tested for suitability under conditions existing in Israel. In this particular case the Fellows, one being responsible for extension work and the other specializing in fish pond building, were selected by the Government before the arrival of the expert. The introduction of plant- and plankton-feeding fish might result in a considerable reduction in the import of foodstuffs and might be expected to increase the natural productivity of the ponds.

The fishing industry of Israel produces about 9,000 tons of fish annually while imports of fish products are about 20,000 tons yearly. Among the limiting factors of the catch have been the availability of craft, skilled labor, good gear and port facilities. Two fellowships have been awarded, and the programs of training are being prepared by FAO Headquarters in the light of the well-known present conditions of Israeli fisheries. One of the fellowship holders is now employed as Chief of the Shore and Pelagic Fishing Branch, the second is skipper of a fishing trawler and responsible for all fishing operations of an agricultural settlement.

Thailand. The increase of animal protein food consumption in Thailand is, as in so many other countries, one of the most important problems of improvement in nutritional standards. In this country, fish culture in fresh- and brackish- water ponds, stocking in rice fields, swamps, canals and lakes, has been assisted by FAO for several years.

About 30 fisheries officers have been trained locally by the FAO expert, four of whom have been sent on fellowships to Indonesia for advanced study in fish cultural practices. All of them are now holding posts as officers in various parts of Thailand, directly applying the techniques involved in fish culture in which they have been trained.

Turkey. The Government of Turkey plans to increase fish production from adjacent seas. Before embarking on this program, assistance was requested from FAO to start a survey and appraise the potentialities, and to recommend suitable measures for the development of marine fisheries in all its aspects.

Five experts, one each in fisheries economics, marine fisheries development, fish refrigeration and fish meal and oil manufacture, have been sent to Turkey. Each expert has counterpart assistants, three of whom are at present studying abroad under FAO fellowships to acquaint themselves with modern techniques, to enable them to continue the work started by the Government of Turkey with the aid of the FAO/ETAP experts.

Turkey is a very good example demonstrating FAO's fellowship policy, for not only has the selection of the candidates been made from young specialists who have been working with the experts, but the experts themselves have also taken the fullest interest in preparing the training programs. In two cases, the Fellows are being trained in the countries of origin of the experts who, having returned home, can guide the Fellows' training themselves, concentrating on the items of greatest importance for their future responsibilities.

Yugoslavia. Three fellowships to develop fish production, fish marketing, and processing industries related to fisheries, have been granted to date in relation to the work done by FAO/ETAP experts, whose assistance was requested by the Government. The FAO Mission is continuing its work in these fields.

The first fellowship was awarded to the Chief Technologist of the Fish Industry Organization of Croatia, who had the opportunity of studying all matters related to the fish industry in European countries, and who is therefore well equipped to assist the experts now at work and to apply the knowledge he has gained. The second was awarded to the Chief of the Technical and Economic Research Section in Zone B who will be trained in modern freezing techniques ; and the third to a research technician at the Institute of Oceanography and Fisheries, Split, for study in Italy with a view to improving the lagoon fisheries along the Adriatic Coast of Yugoslavia.

The Yugoslav fisheries project is again an example of how FAO tries, through specific activities, to assist governments in their over-all development programs.

No.	Country of Origin	Name	Subject of Training	Countries of Training and Observation	Period of Training
1	British Guiana	ALLSOPP, W. H. L.	Fish culture in ponds	Brazil, Haiti. India, Thailand, Malaya, Indonesia, Israel.	July 1953 (first part) January to April 1954 (second part)
2	Chile	BORIES, A.	Fisheries technology, fish processing, fish meal production	Denmark, Norway, Iceland.	July 1954 to April 1955
3	Chile	MONTT DE FERARI, M.	Fisheries economics, statistics, administration	Denmark, Sweden, Norway, France, Portugal, Spain.	January to November 1954
4	Ecuador	REYES VANDEMBERG, C.	Fisheries biology	France	January to December 1954
5	Finland	KAARTOTIE, T. K.	Administrative application and modern research in marine and fresh water fisheries	United States	March to August 1953
6	Finland	HALME, E.	Inland fisheries	United States	September 1953 to February 1954
7	Finland	SILTAMAA, E.	Fresh water fisheries management	United States	September 1953 to February 1954
8	Finland	NIKKILA, O.	Fish canning, fish preservation	United States	December 1953 to May 1954
9	Finland	KAJOSAARI, L. T.	Control of water pollution and fish protection	United Kingdom	May to September 1954

10	Finland	[illegible]	and statistics	many.	
11	Haiti	Bonnefil, L.	Fish culture in ponds	Indonesia	September to December 1951
12	Haiti	Garnier, E. J.	Fish culture in ponds	Brazil, Surinam.	August to October 1952
13	Israel	Rashkes, S.	Fish culture in ponds	Singapore, India, Indonesia.	January to April 1952
14	Israel	Ilan, H.	Fish culture in ponds	Singapore, India, Indonesia.	January to April 1952
15	Israel	Ariav, Y.	Shore and pelagic fishing and trawling methods	Italy, Yugoslavia, Spain.	June to August 1953
16	Israel	Schmalinski, I.	Shore and pelagic fishing and trawling methods	Italy, Greece, Spain, Netherlands.	June to September 1953
17	Thailand	Thiemmed, J.	Fish culture in ponds	Indonesia	April 1951
18	Thailand	Boonbraham, M.	Fish culture in ponds	Indonesia	May to July 1952
19	Thailand	Sidthimunka, A.	Fish culture in ponds	Indonesia	May to July 1952
20	Thailand	Pongsuwana, U.	Fish culture in ponds	Indonesia	May to July 1952
21	Turkey	Ciragan, O.	Fish processing methods	Norway	December 1953 to May 1954
22	Turkey	Akyuz, F. E.	Fisheries biology	United Kingdom	February to July 1954
23	Turkey	Ozisik, N.	Fish handling, refrigeration	Denmark	March to August 1954
24	Yugoslavia	Mikulič, R.	Fisheries technology	European countries, Morocco, Algeria.	June to October 1953
25	Yugoslavia	Simoncič, I.	Refrigeration, processing of sprats	Morocco, Algeria. Denmark.	July 1954 November to December 1954
26	Yugoslavia	Morovič, D.	Lagoon fisheries	Italy	January to March 1953

IV. Outlook

1. *Future Programs*

The funds at FAO's disposal for its Expanded Technical Assistance Program do not permit the implementation of all projects for which preliminary work has already been done. For instance, 17 fisheries fellowships have been listed in the 1954 program for 12 different countries, 6 of which have not as yet received fellowships in this field. The number which can be implemented, however, will probably be somewhat smaller because of an over-all reduction of the program, even though an effort is made to maintain a proper balance between the provision of advisory assistance and training facilities.

It follows that the programs for 1955 and following years depend on the contributions made by the governments.

2. *Training Possibilities Outside FAO/ETAP*

FAO is often asked why the award of fellowships is so strictly bound to specific projects of technical assistance. In fact, fellowships are often requested by individuals, or by governments on behalf of individuals. The answer to this question is easily found. It might, however, be mentioned that many other possibilities already exist for the training of technicians, agronomists and engineers, and FAO does not in any way compete with existing training schemes. The " underdeveloped countries " – this is, in fact, a badly chosen expression, and it would perhaps be better to say " countries in process of technical development " – have national training programs, many of which receive direct financial aid from their governments.

As a very good example, Colombia can be quoted. This country has recently created an institute called ICETEX (Instituto Colombiano de Especialización Tecnica en el Exterior) which encourages young people to study abroad in all kinds of scientific and engineering fields. The Institute finances this training with governmental funds. The scholars or trainees undertake to reimburse the money they receive. They do not have to pay interest on the loans provided they teach on their return, thus spreading the knowledge gained abroad. This example has been chosen as it illustrates the possibility of countries helping themselves in training their own staff, which is also one of the very important aims of technical assistance.

On the other hand, scholarships, fellowships and other training grants are offered by certain host countries. One is very surprised to find in the book " Training Abroad, " edited and constantly revised by UNESCO, the impressive number of training facilities offered by governments, governmental or private organizations, institutes, universities, colleges, etc., all over the world. For instance, many highly talented research workers are still able to get a fellowship from the Rockefeller

Foundation and similar institutions whose aims are to help such people to qualify themselves to the highest standard.

An example of how such facilities may be used is the case of two fellowships related to an FAO forestry mission in Haiti. FAO provided two fellowships in relation to this project; the expert assisted in the selection of the candidates, both of whom were forestry officials, and on his recommendations one was trained in forestry extension work, the other in soil conservation and reforestation. The government had asked for the provision of more fellowships, but due to financial restrictions FAO could not accept this request. The expert, however, was able to obtain a scholarship from a university in the U.S.A. for an intelligent and hardworking forestry student. In addition, some rangers were trained, with the financial help of the Government of Haiti, in a special course at Turrialba, Costa Rica. FAO had thus, without being able to pay all the costs involved, acted as a catalyst in the development of a forest service in Haiti.

Last, but not least, there exist many schemes of bilateral assistance. The U.S.A., for instance, has given remarkable help through the various United States Foreign Aid Programs. The Colombo Plan, sponsored by the Commonwealth countries, trains hundreds of technicians from countries of the Near and Far East. Several European countries have started schemes for technical assistance, notably Norway in the field of fisheries in India, which include the award of fellowships or scholarships.

In view of the existing training possibilities on the one hand and the financial restrictions on the other, it is felt that FAO's fellowship policy, which requires that approved individual requests of governments be planned and budgeted and that Fellows must be nominated by governments, is the right one in principle for FAO.

3. *Evaluation of the Fellowship Program*

Now, after more than three years' work, not only the contributing government and the agencies rendering technical assistance, but also the public interested in an expanding world economy through international co-operation, are desirous to know whether the Technical Assistance Program to underdeveloped countries has proved of value. FAO is starting to evaluate the work done, and a separate enquiry is being made on its fellowship program, the results to be included in the assessment of each project. The main question is to know whether the Fellow who has been trained under the supervision of FAO has been placed in a post where he is able to make full use of his knowledge and thus to contribute to the technical and economic development of his own country. Present indications are that the FAO/ETAP Fellowship Program is being remarkably successful in achieving its declared objectives. This survey will also help to improve the program by showing what part of its operation should be given more attention.

V. Final Considerations

From the beginning, FAO has tried in its Fellowship Program to solve in each case a very specific problem, which is part of an over-all plan of economic development. The Fellow who has been trained in fish culture in ponds should have the opportunity of developing this activity in his own country. The Fellow who has had the opportunity of observing fish marketing in advanced countries should be able to initiate or improve marketing schemes in order to ensure the distribution of fish produced by new techniques of fishing. The Fellow who has learned how to process fish into fishmeal should be put in the pilot plant now in construction. The officer responsible for advising the Director of Fisheries is given the possibility of observing how fisheries administrative services function, enabling him to give better advice.

Have these aims been reached ? It is too early to confirm that in all cases the Fellows are able to undertake their work as expected. However perfect the selection of the right man, the study planning and the training may have been, there are still many unknown factors influencing the implementation of the development plans suggested by FAO. Two main human factors, however, will be over-riding – the sense of responsibility of the Fellow himself, and the goodwill and ability of his government to make full use of the advice of experts and the knowledge of the personnel trained.

The Organization takes this opportunity of acknowledging its indebtedness to the many governments who act as hosts to FAO/ETAP Fellows, and to the officials and firms everywhere who have contributed so much to the happy and profitable sojourn of so many Fellows in so many host countries.

FAO/ETAP FISH HANDLING AND REFRIGERATION PROJECT IN TURKEY

One of the projects of the FAO/ETAP fisheries program in Turkey deals with the handling and refrigeration of fish. Fish refrigeration engineer, Helgi Bergs (Iceland), was assigned to the country from April 1953 to April 1954 to advise and assist the Government in the location, construction and operation of fish freezing plants and cold storage warehouses holding chilled and frozen fish, to demonstrate methods of freezing fish and storing frozen fish, and to advise on methods of handling and transporting fresh, iced and frozen fish.

The Meat and Fish Office of the Turkish Government has an extensive construction program of fish refrigeration plants, covering all the important centers of fish production. While some of the plants have already been completed and are ready to start operation, others are in various stages of construction and still others are only in the blueprint stage. The expert studied all the plants, reported his findings

and, where necessary, suggested improvements and modifications in lay-out, construction and equipment. The distribution of present and potential future fish landings was analyzed in relation to the facilities provided by the building program. It appears that this is more than adequate for present landings. The operation of each plant, its organization, the types of fish available, the most advantageous methods of utilization, the ice making facilities, cold storage and freezing facilities, the most suitable freezing methods for the various types of fish, the best type of packaging of the frozen products, were all studied in detail and specific recommendations made for each plant. The refrigeration machinery in each plant was analyzed and additional units or modifications suggested where necessary. Especially in respect of future construction, certain modifications in insulation, ice making facilities, chilled fish storage facilities, and refrigeration machinery have been recommended to avoid some of the inadequacies of the earlier constructions.

Complementary to these consultations, the expert organized – in co-operation with the Operation and Maintenance Branch of the Mechanical Department of the Meat and Fish Office – and conducted a short course for refrigeration plant personnel. This lasted two weeks and was attended by 18 trainees who received basic instructions and demonstrations in fish handling and refrigeration. The course was intended to serve as a prototype of further training courses to be organized and expanded by the staff of the Meat and Fish Office.

In order to assure the proper development of the fish industry and aid in increasing fish consumption, the establishment of a quality control and inspection service for future implementation was outlined by the expert, including draft government regulations for the handling and marketing of fresh and frozen fish.

Finally, preliminary plans were worked out to develop a sound system of distribution and marketing of fresh fish landings and frozen fish from the main fish producing centers to all the important inland centers of fish consumption. This system is based mainly on road transport by means of large (5 or 7 1/2 tons net) refrigerated Diesel-driven trucks and by means of sea transport with modern refrigerated transport vessels already owned by the Meat and Fish Office. For this purpose, the country was divided into six zones, each comprising the natural marketing area for each of the six largest fishing ports, the largest refrigeration plants situated at these ports serving as collection centers for the fleets of trucks and transport vessels. Suitable distribution routes have been suggested, covering many population centers inaccessible by rail, and the establishment of a proper intelligence service has been recommended to keep consumption centers constantly advised of landings upon which they may draw most advantageously.

This project, together with other FAO/ETAP fisheries projects in Turkey to increase production and fish landings and to provide new ways of utilization of less marketable fish by means of fish meal and oil manufacture, promises to add greatly to the orderly development of the Turkish fish industry.

REFRIGERATION PROBLEMS IN THE FISHERIES INDUSTRIES OF YUGOSLAVIA

W. A. MacCallum (Canada), an FAO fisheries refrigeration engineer, has spent five months in Yugoslavia studying the refrigeration problems of the fishing industries and advising on the ice making requirements of the fishing ports, the feasibility of using fish-carrier boats, the provision of cooler storage facilities for fish processing plants (mainly canneries), the requirements for collection, transport and distribution of fresh fish and the possibilities of freezing fish.

The importance of proper icing of fish in the fishing and transport boats was evident. Wherever this was neglected, the quality of locally landed fish, especially sardines, at the time of landing was inferior, even when the fish were out of water only a few hours, as compared with fish well iced on the fishing grounds, even if shipped considerable distances. The superiority of fish carried in boxes in the fishing and transport boats over bulk shipments was also clearly evident, provided the boxes were not overfilled, so that the weight of the upper boxes rested on the frames of the lower ones and not on the contents of the latter. The same observations and conditions apply to the transport on land by trucks and rail shipments. The quality of the raw material landed at the canneries was obviously and invariably reflected in the quality of the canned goods.

The solution of this problem calls for the provision of greatly increased ice making facilities in many areas, especially since the fishing season coincides with the warmer parts of the year.

A more rational method of collecting fish in collection centers near the island fishing grounds, and adequate distribution to the nearest processing plants are suggested to eliminate waste of fuel and time and for improvement in the quality of the fish on landing. This calls for organization of collection centers, ice supplies, box supplies and carrier boats. This would make possible not only an increase in exploitation of proved fishing grounds but also an extension of the operations to hitherto less or undeveloped grounds.

If adequate supplies of fine ice are available near the fishing grounds, mechanical refrigeration for transport boats would only be required in exceptional cases. As many localities, particularly on the islands, have no fresh water supplies for ice making, the necessity of ice distribution from surplus production elsewhere and insulated ice storage facilities have to be considered.

While in some cases, in the past, icing of the delicate sardines and sprats had undesirable effects on the appearance of the fish, due to the coarsely crushed ice used – and thus actually created some prejudice against icing even where ice supplies were readily available – it is evident that these disadvantages can easily be overcome by the use of fine ice, i. e., the installation of fine ice plants, or the use of ice crusher-blowers.

One of the main problems encountered was the collection, transportation and storage of large sporadic catches of sardines for subsequent canning. As the fishing is limited to the moonless nights each month, canneries are idle during the " bright " part of the moon for lack of raw material and, since the total capacity of the canneries is insufficient to handle more than a limited portion of the large sporadic catches, the problem is twofold, namely to hold the fish for a number of days, by means of chilling, to keep the canneries in operation during the bright part of the moon and to freeze surplus catches and hold them frozen for canning after the end of the fishing season, to extend the canning season into the winter months.

Preliminary conclusions of experiments carried out indicate that it is possible to chill ungutted sardines with ice and to hold freshly caught fish on ice up to three days, without seriously detracting from the high qualities inherent in them. To land fish of this high quality, they must be handled carefully and iced with fine ice at the time of catching, the boxes being filled and subsequently handled in such a manner that the fish are not crushed. The " natural " color of the fish can be retained longer if the iced fish are gutted during the first few hours after catching, but the keeping quality (rancidity development) appears to be not as good as with round fish kept in ice.

The application of salt alone to the fish, at the time of catching, develops excellent " bloom " and color of skin, but fish so treated, then iced a few hours later and stored at O°C., developed unsatisfactory odors and pigmentation after one day. On the basis of the work done, it appears that ice or other means of refrigeration, but not salt, must be utilized at the fishing grounds, if fish are to be kept longer than a half day before being canned (summer conditions).

Chilling, by means of refrigerated sea water, can be substituted for ice chilling and, if subsequent storage is under ice or at the temperature of melting ice, the keeping qualities of the fish are at least as good as for ice chilling. The brine also imparts excellent " bloom " to the fish.

The quality of raw material resulting from low temperature air blast freezing, glazing and low temperature storage of Yugoslav sardines appears to be satisfactory after several months storage. Examination of the canned products prepared from such raw material is incomplete.

As the canning industry is at present the only potential market for frozen fish in Yugoslavia, the development of a frozen fish industry should await the development of wider markets.

The problem of refrigerated transport by rail is twofold : that of organization to assure that a sufficiently large pool of cars, from the very limited supply available, is available at each shipping point on the coast, and the cars returned as quickly as possible on completion of their trips; and that of organizing adequate re-icing en route which is non-existent now and thus contributes greatly to the arrival of poor quality fish at inland markets. Increased use of refrigerated transport by truck would help to overcome the handicap of the scarcity of refrigerated railway cars.

Developments in fisheries refrigeration call for qualified personnel to operate the refrigeration plants. The present personnel require additional training in most cases, and a ten-day short course was organized and held during the expert's assignment in Yugoslavia as a first step in vocational training in fisheries refrigeration (*see* the following article).

In addition, the necessity for technological research in fish handling and processing has been emphasized and the establishment of a Technological and Economic Fisheries Research Station recommended.

FAO/ETAP SHORT COURSE FOR REFRIGERATION PLANT PERSONNEL, RIJEKA, YUGOSLAVIA

During a five months' assignment as ETAP fisheries refrigeration engineer to Yugoslavia, W. A. MacCallum (Canada), became convinced that, in order to assure a better chance of his recommendations becoming implemented, additional training of the personnel in charge of operating and servicing refrigeration plants was essential. As a first step, a ten-day course, giving basic training and instruction, was proposed and readily accepted by the Yugoslav authorities.

On short notice, a program was evolved and put into operation and Mr. MacCallum, assisted by six Yugoslav instructors, gave 18 students a very concentrated course of lectures, demonstrations, discussions and tests, covering 65 hours of work. The following topics were dealt with :

Basic Science : physical and thermodynamic fundamentals ; demonstration of thermometer reading, pressure reading, reduction in boiling point with reduction in pressure.

Refrigeration Engineering : historical background of refrigeration ; commercialization today ; cold storage chains and continuity of refrigeration ; needs from producer to consumer ; components of compression system ; discussion of evaporators ; demonstration of reversed refrigeration ; cycle application for defrosting coils ; completion of evaporators with ratings for modern efficient designs ; reciprocating compressors from old style to modern design ; single stage and booster compressors ; calculations ; demonstration of compressor starting and stopping ; working characteristics and general operating conditions ; mechanical considerations and features in compressor construction – cylinders, piston rods, eccentrics, shafts, types of seals, etc. ; practical examination of compressor valves; condensers, of all types with ratings ; hand expansion valves, automatic expansion valves, thermostatic expansion valves, float valves, capillary tubes, magnetic stop

valves ; examination of condensers ; eutectic mixtures, use of ice and salt for refrigerating railway cars ; temperature conversions. Practical work – removal of head from vertical dell'Orto compressor, dismantle ammonia pump ; discussion of design ; return to working order ; visit to plant to see double pipe condenser, etc. ; charging and maintenance of refrigeration systems ; safety controls, high and low pressure cut-outs, relief valves, water regulating valves ; measurements of cylinder dimensions, head space, etc., of horizontal Barbière compressor; temperature controls, room thermostats, remote bulb thermostats ; repairs and cleaning of refrigeration equipment ; ice making, use, and storage ; opaque and crystal block ice, flak-ice, scale-ice, pak-ice, dry ice ; aspects of cold storage construction ; insulations and reduction in value with moisture pick-up ; vapor barriers and their location ; location of coils in rooms ; adverse effect of humidity to building construction ; jacketed and standard cold storage construction with application to Yugoslavia ; factors influencing the design of refrigerated railway cars ; inspection of two block-ice plants in the city.

Fish Handling and Refrigeration : physical phenomena in fish chilling and freezing (cooling curves and their variance with changing conditions). Discussion and demonstration, at the Hygiene Institute, of bacteriological tests connected with the examination of fresh fish with particular reference to the experimental work then in progress; organoleptic examination of fish with reference to the experimental work in progress at the Institute ; chemical composition and nutritive value of fish ; fat content of sardines and seasonal changes ; reasons for, and method of, glazing ; demonstration of glazing ; practical work with brine-frozen fish ; handling perishable foods ; organoleptic examination at the Hygiene Institute of sardines canned six weeks previously in the course of the experimental work.

The students were a mixed group consisting mostly of mechanics, with some executives. While the majority was found to profit greatly by the course, it was felt that for future training courses candidates should be selected for their ability to carry out refrigeration studies. A fair fundamental knowledge of chemistry, physics, physical chemistry, mathematics, etc., should be a prerequisite for refrigeration training of present and prospective plant personnel.

The instructors were : W. A. MacCallum, FAO expert ; Veljko Brlek, Assistant, Mechanical Engineering Department, Zagreb University ; Godhard Suster, Chief Refrigeration Technician at " Izvor, " the Rijeka Cold Storage ; Dr. Matija Kovacevič, Bacteriologist, Hygiene Institute, Zagreb ; Prof. Stefica Curi, Head of Chemistry Department, Rijeka Hygiene Institute ; Mira Krvarič, Assistant in Chemical Engineering, Oceanographic Institute, Split ; Josko Simoncič, Chief, Technical/Economic/Law Branch, Economic Counsel, Free Territory of Trieste (Yugoslav Zone), Koper.

FAO'S WORK ON THE UTILIZATION OF FISH MEAL IN THE HUMAN DIET [1]

In economically underdeveloped countries there is very often a shortage of animal proteins in the diet. In order to secure normal growth and development, it is of utmost importance that infants and children receive sufficient high quality proteins. One of FAO's tasks is, therefore, to seek to develop the production of animal protein sources.

Milk is the food *par excellence* for infants and children. In many countries, however, sufficient milk cannot be produced (or imported) to satisfy nutritional needs ; the consumption of other protein-rich foods is, therefore, advocated. In economically underdeveloped countries it is essential that such protein-rich foods are very cheap and, if they have to be processed to make them more suitable for transportation, storage and distribution, the processing must also be cheap.

Edible fish meal, or fish flour, falls into this category. The basic material is inexpensive, the protein content high, and it can be processed at a low price.

Fish meal contains 60 to 85 percent protein. In properly manufactured fish meal, i.e. fish meal made from fresh fish or fish offal not subjected to high temperatures, the originally high biological value of the protein will be retained. Moreover, fish meals, if properly manufactured, will contain important nutrients like available calcium, phosphates and vitamins of the B group, mainly riboflavin and B_{12}. In this respect the " whole " meals are the more valuable. Of particular importance is the fact that the fish meal proteins are rich in certain amino acids otherwise scarce in most cereal diets characteristic of underdeveloped regions – for instance, lysine.

The main difficulty in utilizing fish meals in the human diet is their flavor, which easily becomes rancid and too " fishy " for consumers in certain regions, although in other regions the consumers will probably not object to a strong fish flavor, if it is of the type to which they are accustomed. These preferences usually originate from habit and tradition and adults with set tastes will usually object to any deviations, while infants and young children will more easily adapt themselves to flavors of a kind somewhat different from those traditionally preferred by their parents. It has, for example, been reported from one country that adults favored a locally manufactured fish flour with a local " flavor " to an imported product with another (weaker) flavor : the small children, however, showed no preference. Of course, mothers might object to their children being served food which they do not like themselves.

Countries may thus be roughly classified into two groups : those where consumers prefer special fish flavors, and those where the consumers object to such flavors.

It may be said that South East and East Asia, and Equatorial Africa, belong to the first group. In some of the countries in these

[1] Note prepared by the FAO Nutrition Division.

areas locally accepted fish meals are produced on a small scale, without foreign assistance. Angola has a highly developed fish flour industry, organized mainly in co-operatives. Local developments are also taking place in Thailand and the Philippines.

In countries where people object to strong fish flavors there has until now been no fish meal production for human consumption. In such countries fish meals would have to be refined, deodorized, or manufactured in such a way that the final product would be flavorless or practically without fish flavor. Unfortunately, the processing methods for such flavorless fish meals are neither well established nor easily available or transferable to the countries which might want to utilize them.

FAO – the Nutrition Division in co-operation with the Fisheries Division – has endeavored to find fish flours sufficiently flavor-free to be used for incorporation in a number of foods, such as bread flour. Until now only one product – a "deodorized fish meal," developed in the Union of South Africa – has been found fully acceptable for this purpose. A U.S. firm has also developed a flour which may prove to be acceptable. Finally, a European firm has developed a fish flour which, judging from small samples, seems very promising, but which cannot be produced in sufficient quantities as yet. A number of samples of other fish flours has also been collected, but there is still either insufficient information on these or they are too expensive for the purpose. Production costs higher than about 25 U.S. cents per kilogram would probably make the product too expensive for use as a cheap protein supplement to foods in economically underdeveloped countries.

The first experiment with flavorless fish flour has been completed successfully in Chile. This place was chosen for several reasons, among which are: availability of an FAO Nutrition Officer and local nutritionists competent to supervise large-scale acceptability tests with school children; the existence of a school feeding scheme; keen interest on the part of the public authorities; the general "fish-mindedness" of the population; and good prospects for a future local production of fish flour, owing to abundant fish resources.

Based on results from preliminary cookery experiments a large-scale trial was started, during which 140 school children from 5 to 14 years old received every day for six weeks, as part of their school lunch, a 90-gram bread roll made at a commercial bakery which used flour containing 10 percent fish flour. Compared with normal bread, the only difference was a slightly darker color; smell and taste, and form and consistency of crust and crumb were normal. The bread was very well accepted by the children. There was not a single case of rejection or complaint. No digestive trouble traceable to the bread occurred. The 6.1 grams fish flour in each bread roll provided the child with a daily supplement of 4.4 grams protein, 335 mg. calcium, 329 mg. phosphorus, and 3 mg. iron, whereas the roll itself supplied 6.5 grams protein.

UNICEF, which organization has been following the initial stages of the work with great interest, has now appropriated a certain sum of

money to be spent on similar fish flour trials in other countries under the auspices of FAO and UNICEF. Investigations are now under way for the purpose of selecting countries in which acceptability tests could be properly conducted.

Efforts have also been made to find fish meals, manufactured by simple inexpensive processes, with flavors acceptable to populations with flavor preferences, and work in this connection is now in progress.

Correction

FAO Fisheries Bulletin, Vol. VII, No, 2, p. 76, line 28.

Dr. E. Reed is Chief of the Biology Branch of the Department of Fish and Game in Valparaiso, Chile, and not Washington, D.C., U.S.A., as stated.

Conferences and Meetings

8th Session of the United Nations Statistical Commission

The 8th Session of the United Nations Statistical Commission took place in Geneva from 5 to 22 April 1954. L. P. D. Gertenbach attended the meetings of the Session as an FAO representative on behalf of the Fisheries Division.

The agenda included a review of international statistics and the Commission discussed a report of the United Nations Secretary-General (E/CN.3/170) which covered, principally, the status of work in the development and application of standards, concepts, definitions and methods. The section on the program of work of FAO in this field did not cover fisheries statistics.

Mr. Gertenbach, speaking at the invitation of the chairman, made a statement supplying the missing information on fisheries statistics. The summary of this statement, incorporated in the Summary Record of the 102nd Meeting, (E/CN.3/SR.102), is as follows :

> Statistical data relating to certain aspects of fishery industries had been published from time to time in the *FAO Fisheries Bulletin* (which was now appearing every quarter) and, more occasionally, in the *Monthly Bulletin on Agricultural Economics and Statistics*, but most of the statistical material collected and prepared by the Fisheries Division of the FAO Secretariat was issued in the *Yearbook of Fisheries Statistics*, which appeared every two years. The first two yearbooks — those for 1947 and 1948-49 — might be considered as "trial" issues. In the third — that for 1950-51 — a reasonably adequate standard of presentation had been reached in the case of detailed data relating to foreign trade in fishery products. Statistics on catches and landings and on the production of processed commodities (frozen, cured and canned fish, crustaceans and molluscs, fish oils, meals, fertilizers and the like) had not been entirely adequate in the past. It was hoped that the next issue of the yearbook, which would be the fourth in the series and was due to appear before the end of 1954, would show great progress in those fields.
>
> Comments received by FAO suggested that, highly desirable though international comparability might be, it should not be achieved at the expense of more detailed statistics for individual countries, where such detailed data reflected in an accurate and realistic way the basic patterns of fisheries. For example, the Yearbook for 1950-51 presented data relating to catches on the basis of groups of species ; while that grouping was being retained to make international comparability easier, the group totals would, wherever feasible, be broken down to give details for principal individual species.

Requests were being received for time series, covering fairly long periods, of data on total landings and landings of the principal species, such as herring, sardines, tuna, mackerel, cod, haddock, etc. Although it was not possible to present such tables in more than one issue of the yearbook, it was hoped that the requests would be met by presenting data for the period 1910-1953.

At the last session of the FAO Conference, a request had been made for the publication of a bibliography listing national sources of statistical material on fisheries and related matters; the first draft of that indispensable document should be ready towards the end of the year.

FAO maintained continual and close co-operation on statistical matters with the various international fishery bodies, such as, for example, the Indo-Pacific Fisheries Council, the International Council for the Exploration of the Sea, the International Commission for the North-West Atlantic Fisheries, the General Fisheries Council for the Mediterranean and others, for the first named of which the Secretariat was preparing handbooks of fisheries statistics. Technical papers on statistical subjects relevant to the fishery industries were also issued from time to time, and very useful documents had been prepared by those who had taken part in the First International Meeting on Fisheries Statistics, sponsored by FAO and held in Copenhagen in May 1952. Spanish-speaking countries would no doubt be interested in the publication of the *Elementos de Estadística Aplicada a la Pesca*, based on a series of lectures given at one of several training centres dealing with fisheries.

At its previous session, the Statistical Commission had requested the United Nations Secretary-General to consult Member Governments on various problems related to external trade statistics. Supplementary features of this subject included the problem of fish landed directly by foreign fishing craft. This problem was discussed at the 105th Meeting, 6 April 1954. FAO's representative stressed that the problem of fish landed directly in foreign countries should not be examined solely from the point of view of external trade statistics. The logical solution would be to ensure that the statistical treatment of direct foreign landings of fish should be reflected consistently, not only in external trade statistics, but also in the statistics on fish catches and landings and on statistics of fish processing industries.

On behalf of FAO, the view was expressed that countries receiving fish directly from foreign fishing craft should include these with their import statistics. In a similar way, countries making direct deliveries of fish by fishing craft to other countries should include these quantities with their export statistics. With regard to catches and landings, the *domestic production* should include also landings by domestic fishing craft in foreign ports, but exclude all receipts delivered by foreign fishing craft in domestic ports.

Countries should try to include, as part of their industrial statistics dealing with secondary manufacturing activities, processing activities on board craft. When such processed products (frozen fillets, canned commodities, oils and meals, etc.) are landed in the home country, they should not be considered as imports; when landed directly in another country, the recipient should treat them as imports and the country making the delivery should consider them as part of their exports.

Paragraph 13 of the Report to the Economic and Social Council on the 8th Session of the Statistical Commission, reads as follows:

> Fish landed from the original fishing craft is at present treated differently in the statistics of different countries, but, since the countries having important trade of this kind wished it to be included in the statistics and since the representative from the United Nations Food and Agriculture Organization felt that such an inclusion would be useful in compiling trade and production figures for fish,
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> The Statistical Commission Recommends that,
>
> wherever the size of landings is of importance and wherever it is possible to do so, countries should include in their import statistics fish landed directly from foreign fishing craft and include in their export statistics fish landed abroad by domestic fishing craft.
>
> It was the opinion of the Commission that the attribution of provenance by flag of fishing craft would usually produce figures reasonably equivalent to country of provenance.
>
> It was pointed out that the definition of fish and fishing craft would require further consideration by the Secretary-General in consultation with the Food and Agriculture Organization.

As soon as a satisfactory solution has been evolved by the FAO Fisheries Division and the United Nations Statistical Office, the definitions will be published in the *FAO Fisheries Bulletin.*

International Advisory Committee on Research in the Natural Sciences Programme of UNESCO

Oceanographic research in the Indo-Pacific region, and a plan to hold a meeting of experts in Santiago de Chile in 1954 to consider the establishment of a network of marine biology laboratories in Latin America, were among the subjects discussed at the first meeting of this Committee, which took place in Paris, 12-15 April 1954. Observers attended from the World Health Organization (WHO), and the World Meteorological Organization (WMO); Dr. G. L. Kesteven represented FAO.

The functions of the Committee are " to advise the Director-General on research and related matters in the Natural Sciences programme of UNESCO and on the promotion of international co-operation in scientific and technological research. "

International Fisheries Convention 1946 [1, 2]

The Third Meeting of the Permanent Commission set up under the International Fisheries Convention of 1946 took place from 4 to 12 May in Copenhagen, Denmark, at the invitation of the Danish Government. Delegations attended from all the Member

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[1] *See* the press release of the Office of the Permanent Commission, Copenhagen, Denmark.

[2] For a report on the Second Meeting see *FAO Fisheries Bulletin,* VII (1), 26-27.

Governments, namely Belgium, Denmark, France, Iceland, the Irish Republic, the Netherlands, Norway, Poland, Portugal, Spain, Sweden and the United Kingdom. Observers were present from the Government of Western Germany and informed the Commission that notice of their Government's accession to the Convention might be expected very shortly. Observers were also present from the International Council for the Exploration of the Sea (ICES), the International Commission for the North West Atlantic Fisheries, and FAO.

The main items on the Commission's agenda were questions arising out of industrial fisheries, the application of conservation measures south of the present Convention boundary, the arrangements for the enforcement of the Convention provisions affecting the mesh of nets and the size limits of fish, and the problem of the appropriate mesh size for light trawls.

At the Second Meeting of the Commission in November 1953, the question of the industrial fishery for herring involving the capture of undersized whiting had been considered at the instance of the Danish Government, who had been asked if they would study the question further and make proposals to the Commission at the present meeting for the regulation of this type of fishery. At the same time, the Commission had decided to ask the International Council for the Exploration of the Sea for their scientific advice as to the conditions under which industrial fisheries involving the capture of undersized fish, which the Convention was designed to protect, should be carried out.

At the present meeting the Commission was informed that the investigations which the International Council for the Exploration of the Sea thought necessary would take some further time and the Danish delegation proposed that the Convention size limit for whiting should not be given effect until these investigations had been concluded.

The Commission recognized the difficulties facing the Danish Government in enforcing the provisions of the Convention as regards the minimum size of whiting in relation to their newly developed industrial fishery for herring, which is of great importance to the economy of Danish fishermen. The Commission felt it necessary to stress, however, that the purpose of the Convention was to protect immature fish in order to maintain the fisheries at the highest level and that it was the responsibility of every member nation to seek to prevent a diminution in the conservation effect of the Convention. Accordingly, the Commission was of the opinion that any concession which would weaken the protective effect of the Convention in order to meet special problems should be limited as far as possible.

After considering various proposals, including that from the Danish Delegation, the Commission came to the conclusion that the most appropriate course was to recommed the governments of the member countries to accept an alteration of Article 6 of the Convention dealing with fisheries for herring and other species which are not protected under the Convention. This alteration is to the effect that herring fishermen and other fishermen not fishing for protected species may land up to 10 percent undersized fish in landings not for human con-

sumption in the form of fish. This proposal was accepted by all delegations except the Swedish, who reserved their vote for the moment and stated that they would inform the President of the Commission at a later date whether or not they could accept.

The Commission was informed of the discussions that had recently been taking place between the French, Portuguese and Spanish Governments regarding measures for regulating the sizes of mesh of nets that may be used in, and the minimum sizes of fish that may be landed from, the waters between latitudes 48°N and 36°N covering the Atlantic coasts of the three countries from Brittany to the Straits of Gibraltar. The Commission noted that proposals covering this area were now under consideration by the three governments but felt that, for the time being at least, these proposals could not be suitably merged into the 1946 Convention and should be the subject of a separate convention for the area in question. It was felt, however, that the practicability of assimilating the two conventions might be reconsidered at a later date.

On the question of the enforcement of the provision of the 1946 Convention, there was agreement that each member country should periodically inform the Commission of the general arrangements that it was making in regard to its own fishermen.

An interim report was received from the International Council for the Exploration of the Sea on the subject of the investigations so far carried out into the relative " selectivity " of light trawls and heavy trawls ; that is to say, into differences between the effect of light and heavy trawls as regards the minimum sizes of the fish they take. The conclusion from this report, which was accepted by the Commission, was that the evidence available is not yet sufficient to warrant any action by the Commission but that a case had been made out for the continued investigation of the fishing effect of different types of trawl.

The Commission decided to meet annually in future and the fourth meeting will be held in London starting 3 May 1955.

Marine Radar Conference, Bremen, Western Germany [1]

At the Marine Radar Conference held in May in Bremen, Western Germany, 32 speakers from France, Western Germany, Netherlands, Norway, Spain, the United Kingdom and the U.S.A., discussed marine radar, including its use in fishing. Dr. D.H. Cushing, Lowestoft (U.K.) spoke on " British Experiences in the Use of Echo Sounding for Fishing , " Dr. Kietz, Bremen (Western Germany) on " Recent German Echo Sounding Sets in use for Fishing ; " Dr. Ahrens, Kiel (Western Germany) on " Horizontal Direction Findings as applied to Fishing ; " Mr. Slink, Bremerhaven (Western Germany) on " Practical Experiences of Echo Sounding Sets in the German Fishing Industry. "

[1] Abstracted from *The Fishing News*, 21 May 1954.

Fisheries Division Activities

Headquarters

Dr. D. B. Finn, Director, left on 18 May for a tour of consultation and inspection. He is visiting the U.S.A., Canada, Japan, Hong Kong, Thailand and India, and will return to Rome at the end of July. During his absence R. H. Fiedler is serving as Acting Director of the Division.

Dr. G. L. Kesteven was in Egypt during the first week in May and had discussions at the Hydrobiological Institute, Alexandria, concerning the development of a program of close investigation of the Alexandria hydrodrome.

S. J. Holt attended the third meeting of the Permanent Commission of the International Fisheries Convention 1946, Copenhagen, 4 to 12 May (*see* pp. 125-7). He then visited Sweden and Norway to consult fishery workers and visit institutes there particularly with a view to extending the Division's knowledge of fresh-water fishery research being conducted in these countries, and to discuss with fisheries biologists the Organization's proposed survey of aquatic resources [*see FAO Fisheries Bulletin* Vol. VII (1), 22].

M. Girard will act as observer at the XV Congrès national des pêches et industries maritimes to be held in Algiers from 21 to 27 June 1954. The Congress has been organized by the French Government and will include an international meeting on fish consumption.

Dr. E. Hess made a recording on his recent trip to the Indo-Pacific region for broadcasting over a German radio network.

A paper on "Some Aspects of Fish Harbors" was read by Jan-Olof Traung at the meeting of the International Cargo Handling Co-ordination Association, to be held in Naples from 31 May to 8 June 1954.

General Fisheries Council for the Mediterranean (GFCM)

M. Girard attended the Executive Committee Meeting of the GFCM in Algiers, helded 28 and 29 June 1954.

The Third Meeting of the on Council will take place in Monaco from 14 to 19 October 1954 (not from 5 to 9 October, as previously announced).

Fish Marketing Training Center, Hong Kong

C. Beever will be attending the Fish Marketing Training Center to be held in Hong Kong from 12 July to 21 August 1954, as co-director. Director of the Center will be J. T. Wakefield, who has succeeded J. Cater as Director of the Co-operative and Marketing Department, Hong Kong. Dr. Cecil Miles, FAO Regional Fisheries Officer for Asia and the Far East, will also attend during the first few days of the course.

Regional Fisheries Office for Asia and the Far East

Dr. Cecil Miles was at Headquarters in April for discussions. On his return to Bangkok he visited Pakistan and India where he inspected the Crawford (Municipal) Fish Wholesale Market in Bombay in connection with the Hong Kong Fish Marketing Training Center.

IPFC *Occasional Paper* 54/1 "The Status of the Fisheries in River Basin Development," by C. Miles and T. J. Job, is now available.

Regional Fisheries Office for Latin America

Dr. B. F. Osório-Tafall left Santiago on 9 April for a two weeks' stay in Mexico City to discuss with the Government the agreement and arrangements for the Second Latin American Fisheries Training Center. On his south bound trip he visited Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama and Colombia where he conferred with government officials to secure their participation in the Center. It is planned that each country will be represented by two trainees. Dr. Osorio-Tafall also visited Ecuador and Peru.

Horacio Rosa Jr. has been discussing with Lennart Mattsson of the Center of Scientific Cooperation for Latin America of UNESCO the organization of the first meeting to take place in Chile to consider the establishment of international co-operation in marine biology in Latin America.

Dr. A. Vergara, FAO Regional Nutrition Officer, has prepared an "Extensive Report on the Fish Flour Experiment in Chile" which encompasses the results of the various acceptability tests conducted over a period of several months with the co-operation of the Chilean Nutrition Department. Two types of tests were made with samples of "deodorized fish meal" manufactured by the Marine Oil Refiners of Africa Ltd., of the Union of South Africa, namely, (1) mixing 5 to 10 grams of fish flour for serving in 11 recipes tested by a group of persons, who generally accepted them, and (2) adding 5 and 10 percent of fish flour to ordinary flour in bread which was served to a group of 140 school children in 50 days with very satisfactory results. To start

the second phase of this project which will consist of manufacturing fish flour in Chile, first on a small scale, a request for technical assistance was made to FAO by the Ministry of Public Health. A report on the type, make and capacity of the most important fish meal plants in Chile was sent to FAO Headquarters, together with data on the species of fish utilized for the manufacture of fish meal, output of fish meal in Chile, and the results of the analysis of the fish meals produced by the various companies.

The following lectures given at the first Latin American Fisheries Training Center held in Valparaiso, Chile, from 6 January to 14 March 1952, together with a report of the Center – " Informe sobre el Primer Centro Latinoamericano de Capacitación Pesquera, " by Dr. B. F. Osorio-Tafall – have now been printed and are available, either from FAO Headquarters, Rome, or from Dr. B. F. Osorio-Tafall, Oficina Regional de la FAO para Sudamerica Occidental, Huérfanos 782, Casilla 10095, Santiago, Chile :

R. S. Croker	" Administración Pesquera " (Also available in English).
J. C. Marr	" Biologia marina pesquera " (Also available in English).
Sven Sømme	" Fishery Education in Norway " (Shortly available in Spanish).
J. d'Alarçao	" Elementos de estadística aplicada a la pesca. "
F. de Buen	" Las familias de peces de importancia económica. "
Carlos Gonzales	" Higiene y sanidad de los productos pesqueros. "
Mogens Jul	" Productos pesqueros frescos y congelados. "
V. Paz-Andrade	" Principios de economía pesquera. "

The following will be available shortly :

A. Lopez-Matas	" Enlatado, curado y otros metodos de preservación del pescado y elaboración de subproductos. "

Personnel

Dr. G. L. Kesteven was appointed Chief of the Biology Branch as from 1 April 1954.

F.E. Popper (Canada) arrived in Rome on 7 June to fill the position of Chief, Economics and Statistics Branch, Fisheries Division, which has been vacant since Professor G.M. Gerhardsen's resignation. A

graduate of the London School of Economics (University of London), Mr. Popper began his Public Service career in the United Kingdom. For the last six years he has been on the economic staff of the Canadian Department of Fisheries, latterly as economist to the Fisheries Prices Support Board.

Expanded Technical Assistance Program

Resumé of technical assistance progress in fisheries up to 1 June 1954.

Brazil. Recruitment is in process for a master fisherman to carry out exploratory fishing in the Recife area, and for a marine fishery biologist to appraise the marine fishery resources of the country and advise on the formulation of a management program. Both these assignments are planned to begin in July. Consideration also is being given to the assignment later on of a fishery technologist to advise on establishing a fishery technological laboratory.

British Guiana. W.H.L. Allsop, Government Fisheries Officer of British Guiana, who is working on an FAO/ETAP fellowship, reported to Rome after his visits to Thailand, Indonesia and Israel. He has been studying fresh and brackish water fish culture practices to ascertain their suitability for introduction into his own country.

Ceylon. Upon conclusion of his assignment Alan Glanville (U. K.) returned to Rome and prepared the final report on his work over the last three years as fishery engineer in Ceylon ; and has since been repatriated. The three 10 h. p. Diesel engines provided by FAO and installed in local fishing craft in 1952 and 1953, have been made over to the Ceylon Government and purchased by the fishermen in whose craft they were installed. Small craft mechanization in Ceylon is now a permanent feature of fisheries development in the country.

Einar Kvaran (Iceland) has, in conjunction with Mr. Glanville, been endeavoring to install a winch in a local boat in order to demonstrate the extension of the mechanization principle from simple propulsion to the handling of fishing gear. Mr. Kvaran has also been working on mechanizing beach seine operations. He has completed plans for providing servicing facilities for motorized fishing craft for inclusion in the Colombo Plan's new fish harbor proposals ; Mr. Kvaran's contribution includes storage space for trawler stores, machine shops, etc. The equipment, it is understood, will be provided by the Canadian Colombo Plan.

A fish culturist is being provided later in the year to assist in promoting fish production in ponds and other impounded fresh and brackish waters and in natural inland waters.

Chile. Curt Olesson (Denmark) assumed duty early in May as master fisherman (fishing gear technologist) on a 12-month assignment to improve the efficiency of inshore fishermen by demonstrating

gear and fishing methods new to the country and by improving methods currently in use.

A fish handling technologist is being recruited for assignment after July to begin a program of improved fish handling and distribution.

M. Montt, at present in Norway, is continuing his FAO/ETAP fellowship on fishery economic and legal matters.

Colombia. Consideration is being given to the assignment of an expert on fishery administration to advise on the organization of a Fisheries Department in order to secure more effective administration and development of the fisheries.

Costa Rica. Martin Burkenroad (U.S.A.) has assumed duty as shrimp biologist to work on a co-ordinated program in both Costa Rica and Panama. He will assist the governments of those countries in organizing biological investigations into their shrimp resources, and endeavor to establish some means of making an approximate estimate of the abundance of each dominant species of this type of crustacean.

Dominican Republic. S.Y. Lin (China) has completed the present phase of his fish culture project and is being assigned to the Republic of Honduras. He has established fish culture as a sound activity in the Dominican Republic and the Government advised that it will continue this development aimed at producing more animal protein food for rural peoples.

Ecuador. Recruitment is in progress for a fishery technologist for assignment in July to assist the Government in establishing a fish curing station on a pilot plant scale. Claudio Reyes continues his FAO/ETAP fellowship at the French Government Laboratory at La Rochelle.

Egypt. Dr. G. L. Kesteven, Chief of the Biology Branch, Headquarters, visited Egypt early in May to discuss with the Government a working program for the fishery biologist to be assigned there later this year. The expert's work will be co-ordinated closely with the Fouad I Hydrobiological Institute's program at Alexandria, on an integrated program of assessment of the potentialities of the inland fisheries of the country. As a result of this development, the fishery statistician, also required by the Government, may have to be deferred for some months due to lack of funds.

Finland. As a result of the mission which the FAO/ETAP expert A. C. Taft (U.S.A.) completed in 1952, Headquarters Fishery Technologist Hilmar Kristjonsson visited Finland early in June to advise the Government on fish meal manufacture from Baltic herrings.

A fellowship in water pollution and fish conservation was awarded to E. T. Kajosaari in May for study in the United Kingdom and Sweden. D. A. R. Wikstrom, after a period of study in Canada, is completing his fellowship in Germany, Sweden and Norway in fisheries administration. D. E. Nikkila has completed his fellowship on fish processing in the U.S.A.

Haiti. Shimon Tal (Israel) is entering the last phase of his work, and will be concluding his fish culture assignment in July. With good progress in training local staff, there is every hope that the Government will be able to continue and develop their program in fish culture, and expand the fisheries of the natural fresh waters of the country through the release of *Tilapia* and carp. Arrangements are being made for Mr.Tal to visit Jamaica for about ten days in June to assist the Government in formulating policy for fish culture development.

Honduras. S. Y. Lin (China) assumed duty in the Republic of Honduras on a six-month assignment in May, and will seek to assess the development potentialities of the fisheries in natural fresh waters, and of fish farming.

Hong Kong. Nominations are being received for attendance at the Fish Marketing Training Center which will be conducted jointly by the Government of Hong Kong and FAO for 6 weeks from 12 July. Fisheries officers from member countries of the Indo-Pacific Fisheries Council have been invited not only to participate in courses of lectures, but to attend seminars where the marketing situations in their own countries will be described and information exchanged. It is hoped that fisheries officers responsible for fish marketing will benefit not only from the lectures, but also from the experience of their colleagues in neighboring countries.

India. Paul Ziener (Norway), Naval Architect, has concluded the present phase of his work in Bombay, Saurashtra and Kutch, and is now in the State of Madras where he has been working on both coasts. He is particularly concerned with the development of a motorized beach landing craft and with small craft mechanization. G. S. Illugason (Iceland), Fishery Engineer, who will be working for 12 months in the State of Madras, has already visited both coasts. The modifications he has already introduced to the gear of the Government Department's 60-foot motor fishing vessels have already increased catches, and he has also launched both the 22-foot Danish-built crafts furnished by FAO. The latter, one on each coast east and west, have started inshore exploratory work with long lines and small trawls with interesting results.

Consideration is also being given to the assignment of a fishery engineer to work later this year in the State of Saurashtra.

Indonesia. Consideration is being given to the assignment of an expert to assist in implementing the country's training program for research and extension workers in fish culture.

Iran. Preparations are being made to assign a fishery engineer to undertake a fishery exploratory survey in the Persian Gulf and Gulf of Oman, jointly with the Government of Iran and the U.S. Operations Mission to Iran. FAO will make available its fishing vessel *New Hope* for this survey, which will continue for about 12 months.

Iraq. A fisheries biologist is being recruited to study the effects of the great irrigation barrages on the migratory movements of food

fish. He will work in conjunction with a civil engineer, planned for assignment this autumn and early 1955 to assist in designing fish passes and ladders, if found to be necessary.

Liberia. H. van Pel, Fishery Engineer, and J. van Pel, Technologist, both of the Netherlands, have concluded their assignments and their final reports are being reviewed in Rome. It is proposed to continue the work of the fishery engineer at points along the coast other than at Monrovia where fishing from small motorcraft has already been successfully demonstrated by FAO/ETAP experts. This new appointment will be made in the near future.

Mexico. The second Latin American Fisheries Training Center will be opened in Mexico City on 4 October 1954 and will last for ten weeks. Full details of curricula and operations will be issued shortly.

Consideration is also being given to the provision of an expert on increasing the consumption of locally produced fish, particularly in inland areas.

Panama. Martin Burkenroad (U.S.A.) will be continuing with the work on shrimp biology, in conjunction with his work in Costa Rica (*see* Costa Rica).

Paraguay. Consideration is being given to the implementation of a long-standing request for an expert to assess the fishery potentialities of the natural inland waters of the country, and advise on the prospects of fish culture.

Saudi Arabia. G. G. Ferrer (Philippines) has been recruited as fishing gear technologist and will take up his duties in the near future. He will assist in fishery development on both the Red Sea and the Persian Gulf coasts of the country.

Syria. Consideration is being given to the assignment of an expert on fishery administration to assist in organizing a fisheries department, and in formulating its program of work in order to secure more effective administration and development of the fisheries.

Thailand. Due to encouragement by Dr. S. W. Ling (China), further field stations for rearing and distributing fish fingerlings have been established. Stocking material produced and dispatched from the various fishery stations amounts to about 450,000 a month. A new program for swamp improvement and inland fisheries development in the north-east is soon to be initiated under the direction of the Director-General of the Thai Fisheries Department ; sites for field stations are being selected and plans for their construction are being prepared. The extension services are also being further developed. The Thai Fisheries Department is now in a position to assist neighboring countries by the provision of stocking material, e. g., to Cambodia and East Pakistan. Tangible results are now reported from Dr. Ling's visit to Cambodia in 1953 where the work is being followed up by the

U.S. Operations Mission. This summer Dr. Ling will visit Burma for about four weeks to carry out a reconnaissance survey of the potentialities of the inland fisheries.

Turkey. Dr. G. A. Rounsefell (U.S.A.) has concluded his assignment as marine fishery biologist and returned to his post with the U.S. Government ; a successor is being recruited to assist with one specialized phase of the biological program, namely pelagic fish finding and assessment of this resource.

Helgi Bergs (Iceland) has completed his one year assignment as fishery technologist (refrigeration) and submitted his final report. While in Turkey he advised the Meat and Fish Office of the Government on many phases of refrigeration technology and engineering ; he also reviewed the Office's construction program, and has advised on the operational procedures involved in ice-making, handling of iced fish, and various techniques of fish freezing. He has suggested pilot scale operations in order to develop improved distribution and marketing systems for fresh and frozen fish, involving road, rail and sea transport from collecting centers in the main producing regions.

Hilmar Kristjonsson visited Turkey in April and accompanied the Turkish fishery research vessel, *Arar*, on an exploratory voyage along the Black Sea coast of Turkey ; in conjunction with the Meat and Fish Office, the next phase of the fishery exploratory program has been worked out for the fishery engineer, George Napier (U.S.A.), and the new ETAP fishery biologist.

H. K. Henriksen (Norway), fiishery economist, has continued with his analysis of the marketing and distribution systems, and is also advising on the organization of credit for fishermen.

The FAO/ETAP Fellow in fish processing methods, O. Cirigan, is working in Norway, familiarizing himself with equipment which will later be set up in a fish meal plant in Trabzon, Turkey. A second Fellow in fishery biology, E. Akyuz, is working at the Fishery Biology Laboratory at Lowestoft, England ; and a third, N. Ozisič, in fish refrigeration, has started his fellowship in Denmark where he will be visited by Mr. Bergs with whom he worked in Turkey.

Yugoslavia. John Fridthjof (Denmark) in the short time that he has been in the country, has concentrated mostly on the fish distribution system between Rijeka and Zagreb. In Zagreb, he devoted a great deal of attention to the stimulation of fish consumption and, with whole hearted co-operation from municipal and educational authorities, he has already developed considerable consumer interest.

The local Fish Committee in Zagreb is proving particularly active and is being copied in smaller municipalities. Under its auspices the Srdela (Sardine) Campaign is being launched in Zagreb to coincide with the seasonal abundance of this species. Meanwhile Fish Work Units in the schools are engaging the interest of children in the value of fish consumption.

Mr. Fridthjof is devoting attention also to costing, covering not only fish distribution but also analysis of production and depreciation costs of the fishing vessels.

Notes on Films

FISH AND THE SEINE NET. Producer and distributor: Scottish Home Department, Marine Laboratory, Wood St., Torry, Aberdeen, Scotland. Technical data : 16 mm., black and white, sound, 15 minutes running time, titles and commentary in English. Price : £. 20.0.0.

By annotated diagrams the film illustrates the construction and working of the Danish seine and its operation at sea. The performance of the net on the fishing grounds is shown by means of underwater photography, also the shape of the net itself and the working conditions, how the meshes behave under load and how the fish react to the net. Their behavior after being caught as they pass down the funnel into the cod end is also caught by the camera, and the film clearly shows how the young and unmarketable sizes of fish escape through the meshes. The film was shot at the depth of 4 to 5 fms. in a sandy bay off the south coast of Moray Firth, Scotland.

E. H.

FISHERMEN OF QUINTAY. Producer : United Nations Screen Magazine No. 24. Distributor : United Nations Film Section, United Nations, New York. Technical data : 35 mm., black and white, sound, 10 min. running time, titles and commentary in English.

Illustrates the visit of an FAO/ETAP expert and a Chilean inspector of fisheries to Quintay, one of the many isolated fishing villages along the coast of Chile. Under the guidance of the experts the fishermen were encouraged to form a thriving co-operative which ensured stable and equitable prices for their catches. The film shows how village life changed with the increased prosperity of the fishermen.

C. B.

THE WEALTH OF OUR WATERS. Producer : C. L. Aggarwal. Distributor : National Education and Information Films Ltd., National House, Apollo Bunder, Bombay 1, India. Technical data : 16 and 35 mm., black and white, sound, 366 ft. (16 mm.), 916 ft. (35 mm.), 10 minutes running time, titles and commentary in English and Hindi. Price : Rs. 300/-(16 mm.) ; Rs.500/-(35 mm.).

Presents, in a popular manner, modern methods of rearing fish through the various stages from fry to fingerling and rearing to marketable size in a model fish pond. The film is intended to popularize fish farming in the rural areas in tropical countries and thus increase the production of much needed animal protein.

E. H.

Current Fisheries Literature

Selected Publications

FWS 9.11 OCEANOGRAPHY UDC 551.46

Tully, John P. Oceanography — Science of the Sea. Department of
1953 Fisheries, Ottawa, Canada. 20 pp., illus. In English.

An illustrated, popular exposition of oceanography and its relation to fisheries.

FWS 9.11 OCEAN CURRENTS — NORTH ATLANTIC UDC 551.46(261)

Einarsson H., and Stefánsson, U. Drift-Bottle Experiments in the
1953 Waters between Iceland, Greenland and Jan Mayen during the Years 1947 and 1949. *Rit Fiskideildar* 1953, No. 1. University Research Institute, Department of Fisheries, Reykjavik, Iceland. 20 pp., fig., table, appendix. In English.

The results of drift-bottle experiments in the northern North Atlantic carried out during the years 1891-1939 having been discussed by F. Hermann and H. Thomsen in 1946, the present report deals with later experiments and specifically with waters north of Iceland, and presents data for comparison with the earlier records. Releases were made by Hermann and Thomsen in three areas. There were 42 experiments; 380 bottles were released during 1947 (19 percent recovery), and 480 in 1949 (12 percent recovery).

FWS 9.11 HYDROGRAPHY — INDONESIA UDC 551.48(91)

Vaas, K. F., Sachlan, M., and Wiraatmadja, G. On the Ecology and
1953 Fisheries of some Inland Waters along the Rivers Ogan and Komering in South-East Sumatra. *Contributions of the Inland Fisheries Research Stations*, Djakarta-Bogor, No.3. Bogor, Indonesia. 31 pp., tables, map. In English, with Indonesian summary.

Reports the result of observations made during a brief visit to the area in 1951. The physiographic significance of the lebaks is discussed and their hydrobiology described. A lebak is a permanent, or semi-permanent, body of water which annually receives a supply of water during the rainy season when the rivers rise and overflow the banks. The lebak thus corresponds to the billabong of Australia and the bheel of India. The hydrochemistry of plankton and fish fauna of various rivers and streams are also described and there is a brief account of the fisheries in these waters. The authors found that the stagnant large bodies of water showed a better development than the more temporary inundations such as extensions of channels, and streams.

FWS 9.1 FRESH WATER BIOLOGY UDC 57

Carlander, Kenneth D. First Supplement to Handbook of Fresh
1953 Water Fishery Biology. Wm. C. Brown Co., Dubuque, Iowa, U.S.A. 429 pp., bibl. In English.

For "Handbook of Fresh Water Fishery Biology," *see FAO Fisheries Bulletin*, IV (5), 46.

FWS 6.3 PLANKTON — NORWAY UDC 582.26(481)

Halldal, Per. Phytoplankton Investigations from Weather Ship M
1953 in the Norwegian Sea, 1948-49. *Hvalrådets Skrifter*, Scientific Results of Marine Biological Research (Norske Videnskaps-Akademi, Oslo, Norway). 91 pp., tables, illus. In English. Price: N. Kr. 4.

Temperature-salinity diagrams are given for a weather station (66° N, 2° E), situated in a large eddy which produces fairly uniform conditions in the south-eastern part of the Norwegian Sea. Phytoplankton samples obtained by sedimentation and consisting mainly of diatoms, coccolithophorids and unarmored flagellates, showed a small spring increase, a summer peak and a secondary peak in late autumn of 1949. Vertical distribution was uniform except in summer when accumulation in the upper 25-50 meters occurred.

Factors affecting seasonal changes in phytoplankton are discussed. The importance of changes in stratification of the water is stressed in this connection and in relation to the differences between seasonal changes along the Norwegian coast (thermal stratification) and in the North Atlantic (stratification by salinity differences).

FWS 6.3 PLANKTON — ISRAEL UDC 593.7(569.4)

Komarovsky, B. A Comparative Examination of the Relationship
1952, between the "Limiting Elements" and the Development
1953 of Phytoplankton in Several Types of Artificial Fish Ponds. *Bamidgeh* (Monthly bulletin on fish culture in Israel), (Ministry of Agriculture, Fisheries Department, Israel). Vol. 4, No. 9, September 1952. pp. 137-176. tables, fig., bibl. In Hebrew, with English summary; and *Bulletin* No. 5, Sea Fisheries Research Station, Caesarea, Israel, December 1953. 32 pp., tables, fig., bibl. In English.

An account of observations on dissolved nitrogen, phosphorus and silicon compounds and of phytoplankton in three types of fish pond in the Beisan Valley. The response of various phytoplankton types to varying concentrations of the different substances is recorded, and conclusions are offered on the effect of various types of fertilizers.

FWS 1.8 OYSTERS — CUBA UDC 594(729.1)

Farfante Isabel Pérez. El ostión comercial de Cuba. [The Commercial
1954 Oyster of Cuba]. Centro de Investigaciones Pesqueras, Dependencia de la División Agrícola del Banco de Fomento Agrícola e Industrial de Cuba, Playa Habana, Bauta, Cuba.

A brief description of the oyster, *Crassostrea rizophorae*, which grows naturally in Cuban tidal waters. attached to the aerial roots of Mangrove trees. Gives an account of the production centers and of the market; also of the ecology of the species — chiefly temperature and salinity — and of its growth. Mortality, reproduction and sexual characteristics are also discussed.

FWS 1.016 FISHES — ALGERIA UDC 597(65)

Station d'aquiculture et de pêche de Castiglione. *Nouvelle Série* No. 4,
1953 1952. Gouvernement général de l'Algérie. Inspection générale de l'agriculture, Algiers, Algeria. 405 pp., illus., fig., tables, bibl. In French.

Contains eight papers, a number of which are essentially taxonomic. No. 1 is the first part of a catalogue of the fishes of the Algerian coast and deals with Squalidae, Rajidae and Chimaeridae. No. 2, by J. Roland,

presents a diagnosis of some rays of the Algerian coast. In No. 3, Furnestin reports on chaetognaths collected by the *Président Théodore Tissier* in the Mediterranean. In No. 4, A. Hollande and J. Cachon report on the morphology and evolution of a peridinian parasite.

FWS 9.6 REFRIGERATION AND REFRIGERATION MACHINES UDC 621.57

1953 von Bäckström, Matts. Kältetechnik [Refrigeration]. Verlag G. Brown, Karlsruhe, Germany. 665 pp., illus. In German.

A German edition of the Swedish book on refrigeration, published in 1947. The different chapters cover the theoretical aspects of refrigeration and refrigeration machinery and one chapter is devoted to quick freezing of foods.

FWS 9.6 REFRIGERATION AND REFRIGERATION MACHINES UDC 621.57

1953 Reed, P. B. Refrigeration Book for Refrigeration Contractors, Service and Application Engineers. Nickerson and Collins Co., 443 N. Waller Ave., Chicago 44, Ill., U.S.A. 192 pp. In English.

A vest pocket book compiled especially for refrigeration service and application engineers. Consists mostly of tables giving data of interest to refrigeration industry, such as properties of refrigerants, ice making, heat load calculations, etc.

FWS 2.115 BOAT BUILDING UDC 629.12

1954 Ship and Boat Builder Annual Review 1954. John Trundell (Publishers) Ltd., Temple Chambers, Temple Ave., London E.C. 4. 464 pp., tables, illus. In English. Price : 30s.

For previous issues *see FAO Fisheries Bulletin*, IV (4), 43 ; V (3/4), 161 ; VI (5), 212.

FWS 9.6 FISHERIES INDUSTRIES UDC 639.2

1954 Fisheries Year Book and Directory 1953-4. British Continental Trade Press Ltd., 222 Strand, London, W.C. 2. 441 pp., illus., tables. In English, with indexes in French, Spanish and German, and summaries in French.

Follows the same pattern as the 1952-53 yearbook (*see FAO Fisheries Bulletin*, VI (5), 213).

FWS 1.01 FISHERIES — INDIAN OCEAN UDC 639.2(267)

1953 Report on the Mauritius - Seychelles Fisheries Survey 1948-1949. Colonial Office. *Fishery Publications* Vol. 1, No. 3, 1953. H.M. Stationery Office, York House, Kingsway, London, W.C. 2. 145 pp., fig., illus. In English. Price : £ 2.0.0d.

The report is a comprehensive one and includes the following papers :

Part. 1. J.F.G. Wheeler. " The Bottom Fishes of Economic Importance. "
Part 2. F.D. Ommanney. " The Pelagic Fishes and a Note on Tow Nettings. "
Part 3. ————. " Note on Meteorology. "
Part 4. J.F.G. Wheeler. " General Considerations and Conclusions. "

Parts 1 and 2 deal with the catch, stocks, fishing methods, disposal of catches, etc., also with specific subjects such as the problem of poisonous fishes.

Appendices give results of experimental fishing trials and a memorandum on the Green Turtle.

FWS 1 FISHERIES RESOURCES — PORTUGAL UDC 639.2(469)

Gormicho, Joaquin Boavida. Reconhecimento da Area Marítima Fron-
1953 teira à Costa Norte Portuguesa [Exploratory Survey of the Marine Area Off the Northern Coast of Portugal]. Gabinete de Estudos das Pescas, *Publication* No. 9, Lisbon, Portugal. 50 pp., illus., tables, charts. In Portuguese.

An account of a fishing trawler exploratory survey of the continental shelf between the mouth of the River Minho and Cape Mondego off the northern part of the Portuguese coast, with a view to evaluating the productivity of the most frequented fishing grounds in the area, as well as locating new fishing grounds of some commercial value.

FWS 9.10 FISHERIES RESEARCH, BIOLOGICAL UDC 639.2.001.5

Australia, Department of Harbours and Marine. *Ichthyological Notes*
1951, (Brisbane, Queensland, Australia). No. 1, January 1951, 9 pp.,
1953 plates; No. 2, March 1953, 52 pp., plates. In English.

Two numbers have appeared. No. 1 contains a taxonomic paper by T.C. Marshall reporting the occurrence and some bionomic information on 14 species appearing in the coastal waters of Queensland.

No. 2 contains a taxonomic paper by W. Fowler on fishes obtained or observed by the U.S. Exploring Expedition 1838-1842; a further taxonomic study by T.C. Marshall, similar to that in No. 1, dealing with 23 species of fishes appearing in Queensland waters; and a paper on the "Natural History of Somerset Dam and its Fishing Potentialities," by W. Stephenson. This paper reports a study of the ecological conditions in Lake Somerset, including water level, temperature, chemical determinations and biological conditions, and discusses the species of fish occurring in the Lake and the possibilities of introduction of fish into these waters with a view to indicating the further development that might be made of this water.

FWS 9.13 FISHERIES RESEARCH, BIOLOGICAL UDC 639.2.001.5

Berg, Kaj. The Problem of Respiratory Acclimatization. *Hydro-*
1953 *biologia* (Dr. W. Junk, 13 van Stolkweg, The Hague, the Netherlands), Vol. 5, No. 4, pp. 331-350. In English.

Reports experiment on *Ancylus fluviatilis*, a gastropod, directed towards Krogh's theory concerning the possibility of acclimatization of respiration in cold-blooded animals. Krogh stated "one would expect that animals living at a very low temperature would show relatively high standard metabolism compared with others living normally at a higher temperature." Berg finds that in the case of *Ancylus fluviatilis* this is not so. He took specimens from habitats of 11° C. and 18° C. and found that the oxygen consumption of the populations at these temperatures had a ratio of 2.613. When he took specimens from these populations and placed each of them in water of a temperature at which the other population lives, he found a ratio of oxygen consumption of 1.9 for each population as between the 11° C. and 18° C. situation. Comparing these two ratios, 2.6 and 1.9, he finds that the warm water animals have oxygen consumption 1.4 times greater than would be implied by temperature difference between their habitats. Reviews literature and experimental data on other marine organisms, chiefly crustacea.

FWS 9.12 FISHERIES RESEARCH, BIOLOGICAL UDC 639.2.001.5

Briggs, John C. The Behavior and Reproduction of Salmonid Fishes
1953 in a Small Coastal Stream. *Fish Bulletin* No. 94, California Department of Fish and Game, Marine Fisheries Branch, California State Fisheries Laboratory, Terminal Island Station, San Pedro, Cal., U.S.A. 62 pp., tables, fig. In English.

The study was undertaken to obtain information regarding the extent of natural mortality during the egg and larval stages and to gather knowledge of the spawning behavior of these fishes. The report is in two parts. Part 1 deals with behavior and reports observations concerning the silver salmon, the king salmon and the steelhead trout, and gives information in respect of each on range, time of migration, migratory stimuli, rate of migration, age and size, sexual dimorphism, breeding ratio, location of spawning areas, physical characteristics of the redds, breeding activities, post-spawning activities and redd classification. Part 2, dealing with reproduction, describes a redd sampling program. The losses in artificial and in natural propagation are discussed and compared. The study takes its directive substantially from the work of Hobbs in New Zealand and the results are compared with those obtained by him.

FWS 9.12 FISHERIES RESEARCH, BIOLOGICAL UDC 639.2.001.5

Doan K.H. and Douglas C.W. Beluga of the Churchill Region of
1953 Hudson Bay. *Bulletin* No. 98. Fisheries Research Board of Canada, Ottawa, Canada. 27 pp., tables, illus. In English.

Gives notes on sex ratio, life history, length, distribution, food, parasites, behavior, hunting and utilization of the white whale, *Delphinapterus leucas*.

FWS 9.12 FISHERIES RESEARCH, BIOLOGICAL UDC 639.2.001.5

Jones, J.W. Part 1. The Scales of the Roach. Part 2. Age and
1953 Growth of the Trout, Grayling, Perch, and Roach of Llyn Tegid (Bala) and the Roach of the River Birket. Ministry of Agriculture and Fisheries, *Fishery Investigations* Series I, Vol. V, No. 7. H.M. Stationery Office, York House, Kingsway, London, W.C. 2. 18 pp., tables, illus. In English. Price 2s.

Part 1. Discusses the interpretation of scale rings.

Part 2. Gives age composition of shore seine samples and average length of each age-group.

FWS 9.1 FISHERIES RESEARCH, BIOLOGICAL UDC 639.2.001.5(262) — MEDITERRANEAN SEA

Wirszubski, Abraham. On the Biology and Biotope of the Red Mul-
1953 let *Mullus barbatus* L. *Bulletin* No. 7, Sea Fisheries Research Station, Caesarea, Israel. 20 + xxxii pp., tables, fig., bibl. In English.

Deals with *Mullus barbatus* L. in the Eastern Mediterranean. Gives length distribution in trawl samples ; age composition from otolith readings ; sex ratios ; details of maturity, spawning migration, and food, and a general account of the biotope of the Continental Shelf off Israel.

FWS 9.1 FISHERIES RESEARCH, BIOLOGICAL — NORWAY UDC 639.2.001.5(481)

Dannevig, Gunnar. Hvor meget blir der fisket opp av Lofot-skreien ? 1953 [How Much of the Lofoten Cod is Being Fished ?]. *Fiskeridirektoratets Småskrifter* No. 10. Director of Fisheries, Bergen, Norway. 18 pp., fig., tables., illus. In Norwegian.

Describes a tagging program and population study of the Lofoten cod.

FWS 9.1 FISHERIES RESEARCH, BIOLOGICAL — NORWAY UDC 639.2.001.5(481)

Rasmussen, Birger. Om beskyttelse av dypvannsreken i Hvalerdjupet 1953 i Ytre Oslofjord [On the Conservation of the Deep Water Shrimp in the Hvalerdjupet in the Outer Oslo Fjord]. *Fiskeridirektoratets Skrifter, Serie Fiskeri.* Director of Fisheries, Bergen, Norway. Vol. 3, No. 2, 18 pp., fig., tables. In Norwegian.

Discusses the relative merits and probable effects which such conservation methods as higher minimum mesh size, closed seasons, etc., might have on the shrimp stocks in Hvalerdjupet should measures to preserve the stock be deemed necessary when statistical data become available.

FWS 1.5 FISHING — COD, HAKE, ETC. UDC 639.223

Premetz, Ernest D. Destruction of Undersized Haddock on Georges 1953 Bank, 1947-51. *Special Scientific Report: Fisheries* No. 96. United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., U.S.A. 33 pp., illus., tables. In English.

An account of the destruction of undersized haddock on Georges Bank during 1947-51. The estimated destruction is analyzed by differences in years, seasons and areas, and a detailed examination made of the commercial discard of undersized fish in 1951 in respect of weights, number of fish, average weight, size, age, and composition of total.

FWS 9.16 FISH CULTURE UDC 639.3

Huet, Marcel. Traité de pisciculture [Handbook of fish culture]. 1953 Editions " La Vie rustique ", avenue Georges Henri 299, Brussels, Belgium. 2nd edition. xii + 371 pp., illus. In French. Paper covered: Belgian Frs. 270; bound: Belgian Frs. 330.

Mention of the first edition of this work was made in *FAO Fisheries Bulletin* V (2), 93.

FWS 9.16 FISH CULTURE — TAIWAN UDC 639.2(529.1)

Tung-Pai Chen. The Culture of *Tilapia* in Rice Paddies in Taiwan. 1953 *Fisheries Series* No. 2. Chinese-American Joint Commission on Rural Reconstruction, Taipei, Taiwan, China. 29 pp., fig., illus., bibl., tables. In English.

Outlines the natural history of *T. mossambica* Peters, mentions both the advantages that this fish has over others for paddy culture and the problems encountered in expanding its production in the island, and suggests procedures necessary to overcome these difficulties.

FWS 9.17 FISHERIES MANAGEMENT – FISHWAYS, FISH LADDERS UDC 639.3.13

Fulton, Leonard A., Gangmark, Harold A., and Bair, Scott H. Trial
1953 of Denil-Type Fish Ladder on Pacific Salmon. *Special Scientific Report: Fisheries* No. 99. United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., U.S.A. 16 pp., fig., tables. In English.

Gives a short history of the development of the Denil-type fish ladder, and discusses the results obtained by observing the number of blueback and chinook salmon using a ladder of this kind installed side-by-side with a pool-type ladder at Dryden Dam on the Wenatchee River. Of a total of 2,054 fish observed, 89 percent use the Denil ladder, although it carried only 40 percent more flow than the other. The practical advantages and drawbacks of the two types are briefly discussed.

FWS 2.6 FISH TRADE UDC 658.6/8

Louisiana Wild Life and Fisheries Commission. Directory - Commercial
1954 Fish Dealers. Industrial Services Section, Commercial Seafoods Division, 126 Civil Courts Building, New Orleans, La., U.S.A. 44 pp. In English.

A classified directory covering dealers in crabs, crabmeat, crawfish, canned creole specialities, frozen creole specialities, fish, frozen fillets, menhaden products, shrimp, shrimp bran, breaded, canned, cooked, dried, frozen and peeled shrimp.

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Atz, Ethel H. "Experimental Differentiation of Basophil Cell Types in the Transitional Lobe of the Pituitary of a Teleost Fish, *Astyanax mexicanus*," pp. 94-116.

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